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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|----------------------------|
| 10/689,333 | 10/20/2003 | Jian Chen | SAND-01012US0 | 4179 |
| 28554 | 7590 | 04/28/2005 | | EXAMINER LE, THONG QUOC |
| VIERRA MAGEN MARCUS HARMON & DENIRO LLP 685 MARKET STREET, SUITE 540 SAN FRANCISCO, CA 94105 | | | ART UNIT 2827 | PAPER NUMBER |

DATE MAILED: 04/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|-----------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/689,333 | CHEN ET AL. <i>CM</i> | |
| | Examiner | Art Unit | |
| | Thong Q. Le | 2827 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) 25-57 is/are allowed.
- 6) Claim(s) 1-3,5,8,9,11-15,17 and 19-24 is/are rejected.
- 7) Claim(s) 4,6,7,10, 16 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 120303
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

1. Claims 1-57 are presented for examination.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are:
5. Regarding claim 21, a method claim could not depend on an apparatus claim.

Claims must be amended.
6. Claims 2-13, 25-35, 47-48, 52-53 recite the limitation "A method" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Should be changed "A method" to – The method--.

7. Claims 15-24, 37-45,50,55-57 recite the limitation "A system" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Should be changed "A system" to – The system--.

8. Claim 18 recite the limitation "said step" in line 2. There is insufficient antecedent basis for this limitation in the claim.

9. Regarding claim 18, applicant disclosed "said step". It is unclear. Claim must be amended for more clearly.

Double Patenting

10. Claim 17 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 16. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Regarding claim 16-17, claim 17 is repeated from claim 16.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1-3,5,8-9,11-15,17,19-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Arase (U.S. Patent No. 5,969,99).

Regarding claim 14, Arase discloses a system for programming non-volatile (Figure 2) memory, comprising:

a set of non-volatile storage elements (NAND);
a set of control lines (Figure 2, MBLa, MBLb, WL11-WL14, WL21, WL24) in communication with said set of non-volatile storage elements; and
a controlling circuit ((Figure 1, 20) in communication with said control lines (Figures 1-2, SL&WL, SL'&WL'), , said controlling circuit causes a categorizing of said set of non-volatile storage elements into three or more groups (Figure 2, NAND1a, NAND2a, NAND1b, NAND2b) based on behavior of said non-volatile storage elements and causes programming of the non-volatile storage elements using a different programming (Figure 1, VPP, VM) condition for each group(Column 10, lines 62-67, Figures 5-6, Column 13, lines 3-54).

Regarding claims 15, 19-23, Arase discloses the control lines includes a set of bit lines (Figure 2, MBLa, MBLb) and a common word line (WL), and the controlling circuit causes application of program signal on the common word line; and the different program condition for each pertain to the different bit line voltages (Figures 5-6, bit line voltages Vcc 3.3V and gnd , Column 12, lines 1-67, Column 13, lines 1-54), and wherein said categorizing includes charging bit lines for said set of non-volatile storage elements, applying a common control gate signal and allowing said bit lines to discharge, and said programming of said non-volatile storage elements using a different

programming condition for each group includes adjusting a subset of bit line voltages based on how said bit lines discharged (ABSTRACT), and wherein said controller circuit causes initial programming to said non-volatile storage elements prior to said programming said non-volatile storage elements using a different programming condition, said categorizing is based on said initial programming (Figures 5-6), and the initial programming is performed using a common word line signal (Figure 5), the non-volatile storage elements are multi-state storage elements.(Figure 2), and the non-volatile storage elements are multi-state NAND flash memory elements (Figure 1).

Regarding claims 1-3,5, 8-9,11-13, the apparatus discussed above would perform these method claims.

Allowable Subject Matter

13. Claims 4,6-7,10, 16 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 16 include allowable subject matter since the prior art made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Arase (U.S. Patent No. 5,969,990), and others, does not teach the claimed invention having a categorizing includes determining programming speed information of said non-volatile storage elements relative to each other, each group including non-volatile storage elements with similar speed information.

14. Claim 18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 18 include allowable subject matter since the prior art made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Arase (U.S. Patent No. 5,969,990), and others, does not teach the claimed invention having a categorizing includes applying a non-zero source voltage to said set of non-volatile storage elements and, while applying said non-zero source voltage, characterizing threshold voltages of said set of non-volatile storage elements by applying one or more positive voltages to control gates for said non-volatile storage elements and determining whether said non-volatile storage elements turn-on in order to determine whether compare point said non-volatile storage elements have a threshold voltage greater than a compare point.

15. Claims 25-57 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 25-57 include allowable subject matter since the prior art made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Arase (U.S. Patent No. 5,969,990), and others, does not teach the claimed invention having a method and an system for programming non-volatile memory including an adjusting programming of at least a subset of non-volatile storage

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elements that have not reached the target threshold voltage value on behavior of the non-volatile storage elements that have not reached the target threshold value.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thong Q. Le whose telephone number is 571-272-1783. The examiner can normally be reached on 8:00am-5:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoai V. Ho can be reached on 571-272-1777. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thong Q. Le
Primary Examiner
Art Unit 2827

**THONG LE
PRIMARY EXAMINER**